Conversion of human fibroblasts to angioblast-like progenitor cells.

Journal: Nat Methods

Publication Year: 2012

Authors: Leo Kurian, Ignacio Sancho-Martinez, Emmanuel Nivet, Aitor Aguirre, Krystal Moon, Caroline Pendaries, Cecile Volle-Challier, Francoise Bono, Jean-Marc Herbert, Julian Pulecio, Yun Xia, Mo Li, Nuria Montserrat, Sergio Ruiz, Ilir Dubova, Concepcion Rodriguez, Ahmet M Denli, Francesca S Boscolo, Rathi D Thiagarajan, Fred H Gage, Jeanne F Loring, Louise C Laurent, Juan Carlos Izpisua Belmonte

PubMed link: 23202434

Funding Grants: Molecular Mechanisms of Trophoblast Stem Cell Specification and Self-Renewal, TSRI Center for hESC Research, The Stem Cell Matrix: a map of the molecular pathways that define pluripotent cells, Training in the Biology of Human Embryonic Stem Cells and Emerging Technologies II

Public Summary:
Lineage conversion of one somatic cell type to another is an attractive approach for generating specific human cell types. Lineage conversion can be direct, in the absence of proliferation and multipotent progenitor generation, or indirect, by the generation of expandable multipotent progenitor states. We report the development of a reprogramming methodology in which cells transition through a plastic intermediate state, induced by brief exposure to reprogramming factors, followed by differentiation. We use this approach to convert human fibroblasts to mesodermal progenitor cells, including by non-integrative approaches. These progenitor cells demonstrated bipotent differentiation potential and could generate endothelial and smooth muscle lineages. Differentiated endothelial cells exhibited neo-angiogenesis and anastomosis in vivo. This methodology for indirect lineage conversion to angioblast-like cells adds to the armamentarium of reprogramming approaches aimed at the study and treatment of ischemic pathologies.

Scientific Abstract:
Lineage conversion of one somatic cell type to another is an attractive approach for generating specific human cell types. Lineage conversion can be direct, in the absence of proliferation and multipotent progenitor generation, or indirect, by the generation of expandable multipotent progenitor states. We report the development of a reprogramming methodology in which cells transition through a plastic intermediate state, induced by brief exposure to reprogramming factors, followed by differentiation. We use this approach to convert human fibroblasts to mesodermal progenitor cells, including by non-integrative approaches. These progenitor cells demonstrated bipotent differentiation potential and could generate endothelial and smooth muscle lineages. Differentiated endothelial cells exhibited neo-angiogenesis and anastomosis in vivo. This methodology for indirect lineage conversion to angioblast-like cells adds to the armamentarium of reprogramming approaches aimed at the study and treatment of ischemic pathologies.

Source URL: https://www.cirm.ca.gov/about-cirm/publications/conversion-human-fibroblasts-angioblast-progenitor-cells